

Running head: Electronic Journals versus Print Journals

U.S. Army-Baylor University Center

Graduate Program in Healthcare Administration

Dwight D. Eisenhower Army Medical Center (DDEAMC) Staff

Preferences:

Electronic Journals versus Print Journals

A Graduate Management Project Submitted to The Residency  
Committee In Candidacy for the Degree of Masters in Health Care  
Administration

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By

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### Abstract

The purpose of this research was to evaluate Dwight D. Eisenhower Army Medical Center (DDEAMC) staff preferences with regards to print and electronic journals. Based on a review of the literature concerning the electronic journal revolution occurring in the academic/scientific arena, it was hypothesized that a person's age, computer skill level and job position may influence a person's journal preference. A random sample of n = 235 staff/students was obtained from the DDEAMC population using a self-administered survey concerning journal format preference. Phi correlation and Chi square tests were used to test the independent variables age, computer skills, and job position with the dependent variable, journal preference. The test yielded statistically significant results supporting all three hypotheses. The results of this research may be utilized by the Health Sciences Library to assist in the development of a strategic plan to facilitate a migration from print journals to electronic journals in the near future. In doing so, the Health Sciences Library will ensure the best possible support to its customers which will ultimately have a positive impact on patient care.

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## Introduction

### *Overview of Dwight D. Eisenhower Army Medical Center (DDEAMC)*

DDEAMC can trace its lineage back to the Camp Gordon Station Hospital built in 1941 to provide care for World War II casualties (Eisenhower Army Medical Center, 2002). During the height of the war the facility expanded to over 1,600 beds. The end of the war brought with it the closing of many of the installation's tenant organizations to include the Station Hospital in 1946. It was not until the Cold War that the hospital would open its doors again. The hospital fluctuated in both size and capacity as the need required during both the Korean and Vietnam Wars. It was during the Korean War that officials initiated the planning for a replacement facility for the then dilapidated hospital. Formal ground breaking for the new medical facility took place on April 23, 1971. In 1973 the hospital became a medical center with a research and teaching mission in addition to its current patient care mission. The new facility was dedicated on April 24, 1975 and open for patient use one year later in April 1976 (Eisenhower Army Medical Center, 2002).

DDEAMC's mission is to ensure readiness in support of the nation's military forces by providing and managing quality health care to its beneficiaries in the Southeastern Region; promoting health and wellness of the military family; and

providing highly trained health care professionals (Eisenhower Army Medical Center, 2002). DDEAMC is currently a 150-bed facility that provides specialized care to a population of more than one million beneficiaries in eight-states and Puerto Rico (Eisenhower Army Medical Center, 2002). Services provided range from primary care to open heart surgery. DDEAMC's average daily workload includes 70 inpatients; 43 admissions; 1,164 outpatient visits to various clinics; 20 surgical procedures and over 3,000 prescriptions filled (Patient Administration Department, 2002). In 1996 DDEAMC was designated as the first Department of Defense Specialized Treatment Services (STS) facility for Cardiac Surgery and Interventional Cardiology (Eisenhower Army Medical Center, 2002). Prior to this designation DDEAMC was performing 180 cardiac cases per year, however, since the designation DDEAMC performs 300-350 cardiac procedures per year (Eisenhower Army Medical Center, 2002). Aside from its patient care mission DDEAMC continues to have an education mission.

DDEAMC has a comprehensive graduate medical education department. Included in the graduate medical education program are family practice, internal medicine, general surgery, oral surgery, orthopedic surgery, transitional internship, and clinical psychology (Graduate Medical Education Office, 2002). There are approximately 27 first-year physicians and over 88 residents at varying levels of specialty training. Other

professional training programs at DDEAMC include surgical podiatry, healthcare administration, clinical nursing anesthesia program and Clinical Pastoral Care. DDEAMC also has training agreements with the Army Medical Department Center and School (AMEDDC&S) to provide clinical training for soldiers in the following technical specialties: occupational therapy; medical lab; physician assistant; radiology specialist; operating specialist; ENT specialists; orthopedic specialty; eye specialty training; and blood donations operations (Graduate Medical Education Office, 2002). Additionally, Health Professions Scholarship Program (HPSP) and Uniformed Services University of Health Sciences (USUHS) students along with Phase II Physicians Assistant students, totaling over 66 students, are provided access to the Health Sciences Library. Local medical students from the Medical College of Georgia (MGC) and other technical schools, totaling over 210 in 2001, also have day access to the library. It is worth noting that DDEAMC is one of the sites for phase II of the 91W licensed practical nurse program. In order to best support both its patient care mission as well as its education mission, DDEAMC operates a comprehensive Health Sciences Library.

#### *Overview of DDEAMC Health Sciences Library*

The DDEAMC Health Sciences Library serves the informational and administrative needs of all assigned personnel and students.

The library provides computerized access to information databases for research. Some of the available services include MEDLINE, INFOTRAC Health reference center and Internet access (DDEAMC Health Sciences Library, 2001). The library offers Selective Dissemination of Information (SDI) that performs automatic monthly searches on a topic of interest, tailored to a person's specific interest. Additional resources available include a book collection of over 18,000 volumes focused on clinical medicine and an extensive audio-visual collection (DDEAMC Health Science Library, 2001). The Health Sciences Library also has a comprehensive reference section of medical textbooks and an elaborate collection of journals. The Health Sciences Library has approximately 583 print journals and just fewer than 700 electronic journals (DDEAMC Health Science Library, 2002). Other services provided by the Health Sciences Library include interlibrary loan (ILL), photo copying, and personal book purchase. The hours of operations are from 0830-1730 Monday thru Friday. However, the library is accessible at anytime via the Administrative Officer of the Day (AOD) (DDEAMC Health Sciences Library, 2001). Aside from providing support to the personnel at DDEAMC, the Health Sciences Library provides support to ten subordinate commands throughout the South Eastern Regional Medical Command (SERMC) primarily through an interlibrary loan program.

*Conditions Which Prompted the Study*

Research library expenditures on journals comprise 70 percent of their budget on average. Research libraries in the United States spend over \$500 million on journals annually (Luther, 2000). Odlyzko stated in his article "Competition and Cooperation: Libraries and Publishers in the Transition to Electronic Scholarly Journals" that a library's non-subscription (i.e. operational) costs are on average double the subscription costs (1999). Thus for every \$4,000 publishers generate in revenue in journal subscriptions, libraries in aggregate spend at least \$8,000 on ordering, cataloging, shelving, and checking out material (Odlyzko, 1999). Decreasing budgets and advancing technologies have caused many professional academic research libraries to re-evaluate their current business practices regarding professional journals and how they are provided. In the past many organizations had robust budgets that allowed for liberal spending on journal subscriptions. However, decreasing budgets and increasing cost for print journals coupled with better skilled computer users have prompted many academic research libraries to look at more cost effective and efficient venues for providing access to scholarly journals. The answer for many institutions is the electronic journal. An electronic journal is broadly defined as any journal, magazine, e'zine, webzine, full-text article, newsletter or type of electronic

serial publication that is available through the Internet (Electronic Journal Miner, 2001). It has yet to be determined if electronic journal subscriptions actually save money, but first reports, ironically enough, suggest they may actually increase the cost of doing business. However, the efficiency afforded by electronic journals may outweigh the additional costs, not to mention that an increasing number of professional students and researchers are showing a preference for the electronic media because of the ease of use.

Budgetary concerns raised the question as to whether or not the DDEAMC Health Sciences Library should continue to subscribe to a print version of a journal if it was available in electronic form. The underlying assumption was that subscribing only to the electronic version would reduce the libraries' overall journal costs. The initial question caused the organization to reflect on whether or not it was truly meeting the needs of the staff/students and how the use of electronic journals might better meet those needs.

Rapid advancements in technology now allow for rapid access of large quantities of information not possible five years ago. This has led many organizations, to include governmental agencies, to view technology as an opportunity for future business operations. The Department of Defense (DOD) Integrated Digital Environment Initiative lays out the roadmap for the

transition to "paperless operations" (Department of Defense, 2002). This prompted the Department of the Army (DOA) to create the Army Knowledge Center or Army Knowledge Online (AKO) (United States Army 2002). The goals established for Army Knowledge management are to: (1) Get it right -allow the Army's Enterprise Information to be accessed more quickly and easily for less cost; and(2) Get Ahead -use information technology to leverage Army-wide innovation in services, processes and knowledge creation (United States Army, 2002). In support of this effort, the Army Medical Department (AMEDD) created the Knowledge Management Exchange. The Center for Healthcare Education & Studies (CHES) and the Stimson Library at the Academy of Health Sciences are partnering on a project to streamline library operations and provide superior information retrieval services for their users (United States Army Medical Department, 2002). Their goal is to identify the widest possible range of digital as well as traditional AMEDD data sources and provide rapid access to AMEDD Knowledge workers through one single point of entry (United States Army Medical Department, 2002). In keeping with DOD, DOA, and the AMEDD initiatives, the Health Sciences Library should consider incorporating these strategic initiatives into its own strategic plan.

*Statement of the Problem*

DDEAMC Health Science Library annual operating budget is \$500 thousand with 60 percent allocated for professional journal subscriptions (DDEAMC Health Sciences Library, 2001). The staff must determine how to best allocate their limited resources in order to meet the needs of their customers. Prior to making a transition to electronic journals, DDEAMC Health Sciences Library should research the potential impact on cost, advances in technology, and user preferences for journal format. The purpose of this paper is to study only the facet of journal preference. Both the cost impact and technological impact warrant additional study.

*Purpose*

The purpose of this research project is to gain a better understanding of DDEAMC staff preferences regarding electronic and print journals.

*Hypothesis*

A person's age, job position and computer skills will be studied to determine their impact on journal preference.

## Independent Variables:

X<sub>1</sub> Person's Age (nominal)

X<sub>2</sub> Job Position (nominal)

X<sub>3</sub> Computer Skills (nominal)

## Dependent Variable:

Y Journal Preference (nominal)

## Hypothesis 1: Age

H<sub>a</sub>: The older a person the more likely they are to prefer print journals

H<sub>o</sub>: The older a person the more likely they will equally prefer print and electronic journals

## Hypothesis 2: Job Position

H<sub>a</sub>: A person in a full-time job position as a staff member is more likely to prefer print journals over electronic journals

H<sub>o</sub>: A person in a full-time job position as a staff member will equally prefer print and electronic journals

Hypothesis 3: Computer Skills

H<sub>a</sub>: The greater a person's computer skills the more likely they are to prefer electronic journals

H<sub>o</sub>: A person's computer skills will have no bearing on journal preference

*Definitions*

Electronic Journal - any journal, magazine, e'zine, webzine, full-text article, newsletter or type of electronic serial publication that is available through the Internet.

Computer Skills - a self-reported measure by individuals based on their ability to use computers and common programs to include word processing, database management, spreadsheet use, Internet use, and email use.

Job position - the job function a person performs at DDEAMC.

Respondents were asked to place themselves in one of six pre-established categories set by the surveyor to facilitate data analysis.

### Literature Review

Electronic journals represent a significant and ever increasing part of many academic libraries' offerings. As this demand continues to increase, librarians will continue to be faced with decisions relating to acquisition and services (Luther, 2000). Should libraries retain both print and electronic versions of professional journals or will electronic journals alone suffice? Keller recently conducted a Delphi Study utilizing an expert panel of 45 scientists, publishers, librarians and journal agents (2000). The panel agreed that print journals would see more change in the next 5 to 10 years than during the previous 300-years (Keller, 2000).

There is little question that electronic journals will change the future of scholarly research, in terms of both a distribution mechanism for research results and as an information repository (Rusch-Feja et al., 1999). Many libraries are starting to consider electronic delivery the primary format for scientific and technical journal articles (Montgomery, 2000). This migration from print journal to electronic media will bring with it significant change that will impact the resources required by academic research libraries. There is little debate that the current role of libraries will change with the adoption of electronic journals. They will more

than likely decrease in size and become managers of information versus repositories of print journals (Montgomery, 2000).

Odlyzko stated in his article, "Tragic Loss or Good Riddance? The Impending Demise of Traditional Scholarly Journals", that print journals were an "awkward artifact" that were the only means available for the last few centuries for large-scale communication (1995). He stated that the evolution to electronic journals would occur because of the growth in the amount of scholarly literature combined with advances in technology (Odlyzko, 1995). Odlyzko went on to say that the speed with which scholars would adopt this new form of technology would depend on how quickly they are prepared to break with traditional methods in favor of what he called a superior system (1995).

The world of academia is standing anxiously on the shoreline watching the rapidly approaching electronic journal tidal wave. More and more academic research libraries are migrating to electronic journals. In fact, there are accredited academic institutions that function with complete digital libraries. Examples are Jones International University (2000) and the University of Phoenix (2000). Many other libraries such as the University of California have created vast electronic journal collections (Montgomery, 2000).

Technology has been a large contributor, if not sole cause, for the electronic journal evolution. Caroline Montgomery, Dean of Libraries at Drexel University, stated that developments in computer technologies have "irrevocably altered library operations" (Montgomery, 2000). Technology greatly affects the attitudes about publishing and reading electronic journals. It is the employment of technology in electronic journals that has increased the efficiency with which researchers now operate. There are numerous advantages to electronic journals including purchasing power, decreased space requirements, enhanced search ability, increased accessibility, and currency of information. Electronic journals offer incredible purchasing power. In 2000, Drexel University's print journal subscriptions cost an average of \$150 per title while the average cost for an electronic journal was \$65 per title (Montgomery, 2000). This difference is more remarkable when one considers that nearly all-electronic journals come with several years of back files (Montgomery, 2000). Acquiring back issues of print journals would be cost prohibitive (eLib, 2000). Hawbaker and Wagner concluded that for a full-text business database, the University of the Pacific's library could more than double its journals for a 15 percent increase in expenditures (1996).

One of the greatest challenges faced by academic libraries is management of physical space required by print journals.

Electronic journals greatly alleviate space concerns and help preclude the trimming of the collection, converting to microfilm or storing old journals in remote locations (Montgomery, 2000). Fox indicated that the cost savings are considerable. In the case of Drexel University, an estimated cost of \$100 per square foot was used (the minimum cost for library buildings in large urban areas). The 20,000 square foot space occupied by the Drexel journal stacks alone would cost \$2 million to construct and does not include the annual maintenance costs at \$12 per square foot. The annual cost of facilities maintenance for Drexel's journal collection alone is approximately \$240,000 per year (Montgomery, 2000).

A recent survey of researchers was conducted within the Max Plank Society, the German basic research organization to ascertain researcher's use and acceptance of electronic journals (Rusch-Feja & Siebeky, 1999). The survey results showed a significantly high acceptance of electronic journals among research scholars and an unwillingness to return to print journal version only. The major advantages listed by the respondents included direct accessibility from their desktops, the prompt availability of material, the currency of the information, and the possibility of full-text article retrieval (Rusch-Feja & Siebeky, 1999).

Though electronic journals offer numerous advantages there are some key disadvantages worth considering, including image and text quality, system requirements, and staffing changes.

One disadvantage identified by many electronic journal users is that the viewing quality of information is not the same resolution available in a print journal (Sathe et al., 2000). Information displayed on a monitor cannot substitute for papers, both in terms of utility and convenience (Valauskas, 1994). According to Tufte, paper is believed to be holding up to 50 times more information for a given space than a monitor (1991, p.3.). Studies also indicate that readers have a low tolerance for reading large amounts of online text (Grill, Luk, & Norton, 1988).

A second disadvantage of electronic journals is the need to maintain current automation systems. In order to access and take full advantage of electronic journals and resources, libraries must have and maintain proper equipment. While space is the most important consideration in dealing with print journals, computers and network capability are by far the most important consideration with regards to electronic journals. Computers bought and utilized for multimedia purposes are often obsolete within three years (Freisen, 1998). While many institutions already have information systems in place, a complete transition to electronic media would require

institutions to maintain state of the art systems in order to take advantage of future electronic journal capabilities. Libraries could potentially face a large, reoccurring capital expenditure every 3 to 4 years. Additionally, advanced technology systems and networks require a considerable amount of maintenance and up keep.

Another disadvantage of electronic journals involves library staffing. While the adoption of electronic journals will reduce work in areas such as serial shelving, binding and cataloging, it will increase work in new, more expensive areas such as technical support. Libraries will now have to have information specialists on staff to maintain elaborate information systems and networks. These information specialists will surely consume a far greater share of the libraries limited staff budget than did the administrative assistants who performed the aforementioned tasks rendered obsolete by electronic journals (Montgomery, 2000).

The transition from print to electronic journals is occurring at a rapid pace even though several key issues have yet to be resolved. If organizations fail to consider issues such as these their transition to electronic journals may not yield the expected results. Issues concerning cost, archiving and licensure must be taken into consideration.

One of the major concerns with any transformation plan is that of cost. A common assumption is that converting library journals to digital format will lower costs but this has yet to be proven (Montgomery, 2000). Preliminary cost comparisons for processing print versus electronic journals indicate that electronic journal collections are substantially more expensive to maintain. The per journal purchase price may be lower for electronic journals but this is often negated when most journals must be purchased as part of a "bundle" (JSTOR, 2002). Additionally, the work reduction in certain areas such as shelving, binding and archiving is more than offset by the increased demand for more complex tasks such as network administration. However, the increasing use of electronic journals indicates their preferred status by library users. This new found popularity and preference may justify the additional costs of electronic journals.

A second major concern with electronic journals is that of archiving. This was an issue identified by a 45 person expert panel during a Delphi Study with regards to long-term availability of information (Keller, 2000). Librarians worry about who is going to be responsible for archiving the electronic materials and insuring that important scholarly publications are available for tomorrow's researchers (JSTOR, 2000). During its transition to electronic journals, Drexel

University took the position that archival storage is not part of the library mission (Montgomery, 2000). Drexel put forth that archiving would be much more cost effective if done at national or even international levels. Drexel University said it was willing to make a leap of faith in that someone would develop archives and that they were prepared to pay the cost to have access to that material (2000). There are numerous national and international organizations addressing the archiving issue to include the Research Library Group and the Online Library Computer Center (Montgomery, 2000). One of the most promising prospects to remedy this situation is JSTOR. JTSOR is an organization that builds journal back files and provides access for a fee (Montgomery, 2000). JSTOR's objective is to reduce long-term costs associated with the storage and care of journal collections by guaranteeing online availability of back files (JSTOR, 2002). Many academic libraries are conducting internal analysis and deciding that it is more important for them to provide electronic access to journals now than spend precious resources on storing old journals that may be referenced only once or twice in the future.

The last major concern is site licensure. Libraries are provided access to publisher's databases through a license, but they do not own the content. This results in many libraries forgoing access to previous issue if they discontinue their

subscription. The limited information available in the literature suggests that this is a point that should be negotiated between the libraries and publishers prior to any contractual agreement.

Until recently limited research had been conducted on electronic journal usage and preferences. To date, most research has focused on usage patterns rather than user preferences. Morse & Clintworth demonstrated an overwhelming preference of users for electronic access when it was available, especially when linked directly from databases to the full-text articles (2000). In their study they compared usage rates of electronic journals to those of print journals. The single most striking observation from the data comparison was the sheer predominance of electronic usage compared to that of print. During the six-month study period, there were approximately 28,000 electronic viewings of full-text articles from the study subset compared to only 1,800 uses for corresponding print volumes (Morse & Clintworth, 2000). This study suggests that users accessed the electronic versions more than fifteen times as often as the print journal during the six-month period. Rusch-Feja & Siebeky report in their study, "Evaluation and Usage Acceptance of Electronic Journals", that over six hundred researchers and scholars were unwilling to dispense with electronic journals (1999). Vanderbilt Biomedical Library

investigated the impact of electronic journals on research processes. The results of this research indicated that fellows, students and residents preferred electronic journals whereas faculty preferred print journals (Sathe et al., 2000). The demand for electronic journals is so great by users that many reference librarians lament that students act as if resources do not exist if they are not online. This change in preference is further evidenced by declining book circulation and rapid growth in the use of electronic resources (Luther, 2000).

Many of the research studies conducted on electronic journal usage patterns had limitations in their methodology. In most, researchers had to, in some way, inconvenience the end-user in order to identify usage patterns. The most common approach involved taking certain journals and holding them at the reference desk thereby requiring the user to ask for the journal. In some cases, this inconvenience may have resulted in some individuals forgoing the use of a particular journal (Luther 2000). The second limitation was access to available data on electronic journal usage. Because libraries license journals they do not own the content and must rely on the publisher/provider for usage data (Luther, 2000). Obtaining meaningful data from publishers has proven difficult if not impossible for many librarians (Luther 2000). Luther indicates that many publishers state they do not have the data because it

is costly to collect, however, a more realistic explanation is that publishers fear disclosure of usage data because it may cause some libraries to cancel print journal subscription in favor of the more popular electronic versions (2000).

A review of the literature revealed little information concerning the preferences of healthcare providers attitudes toward electronic journals. One study was identified as an exploratory study conducted by Wright, Tseng and Kolodner involving 314 physicians at a large, university-affiliated teaching hospital. The purpose of their research study was to learn more about physicians' opinions and attitudes with regards to electronic publications in the areas of awareness, quality, authorship, paperless state and convenience (Wright et al., 2001). Their study revealed that 54 percent of the physicians surveyed were aware of electronic journals. Twenty-six percent of the respondents believed electronic journals would lead to lower quality work appearing in medical literature. Twenty-five percent felt that the prestige of authorship would be lessened as a result of electronic journals. Close to 75% stated they would miss the convenience of being able to read a journal anywhere as with print journals. Of interest, the survey indicated that electronic journals were better received by those physicians with better computer skills (Wright et al., 2001). A second study conducted by Hurd at Vanderbilt Biomedical Library

reported that health science researchers valued the convenience and time-saving features of electronic journals including 24 hours a day and seven days a week access from office, laboratory, and home (2001).

## Methods and Procedures

### *Sample*

A random sample of available staff/students was gathered for primary data analysis. Due to limited resources, limited access to personnel and time constraints it was not feasible to survey the entire DDEAMC population. The use of random sampling helped protect against bias of the sample and permits for generalization of the results to the population from which the sample was drawn.

The sample for this research project was limited to the staff/students assigned to DDEAMC. This research project focused on staff and students because the Health Sciences Library supports both groups. The goal was to include as many of the staff/students in the sample as possible (increasing the sample size) to produce results that were representative of the entire DDEAMC population. The information gathered will facilitate the Health Sciences Library in making informed decisions based on the preferences of the population supported.

The DDEAMC population consists of approximately 2,000 personnel to include men and women ranging in age from 17 to 50 plus years old. Personnel are both civilian and military with varying levels of education. Included in the population are full-time employees, part-time employees, contract workers, volunteers, and full-time students.

*Instrumentation*

A self-administered survey was used to gather primary data for analysis in evaluating staff/student preferences towards journal format. This method of data collection was chosen because of the versatility offered by this technique. A survey is one of the few methods that allow researchers to gather data about attitudes or personal preferences (Cooper & Schindler, 2000). Self-administered surveys are also efficient and economical. However, surveys are not without limitations. First, a major weakness of surveys deals with the quantity and quality of the information secured which depends on the ability and willingness of survey respondents to cooperate. Second, respondents may not have the knowledge sought or even have an opinion on the topic. Third, respondents may interpret questions differently than intended by the researcher (Cooper & Schindler, 2000). For purposes of this research study it is assumed that all respondents answered the survey in an honest and sincere manner.

*Validity*

The validity of an instrument concerns itself with the ability of that instrument to effectively measure what it purports to measure (Soeken, 1985). The survey instrument utilized in this research contained construct validity because the survey instrument was patterned after survey instruments

used in previous research studies: A Study of Graduate End-users Use and Perception of Electronic Journals (Liew et al, 2000); Electronic Journals A Delphi Study (Keller, 2000); Comparing Patterns of Print and Electronic Journal Use in an Academic Health Science Library (Morse & Clintworth, 2000); Evaluation of Usage and Acceptance of Electronic Journals (Rusch-Feja, 1999); Print versus electronic journals (Sathe et al, 2000); Physician Opinion about Electronic Publications (Wright et al, 2001); Digital Collections, Acceptance and Use is a Research Community (Hurd, 2001); and Ejust, ejournal user study (Standford University, 2000). Additionally, all questions in the survey instrument solicited first hand information that all respondents were qualified to answer. For example, respondents were uniquely qualified to answer factual questions concerning their age, student status, job position, computer skills and computer usage patterns. The remaining questions concerning journal use and preferences yielded valid data because they too were soliciting first hand information from the respondent with regards to personal preferences.

#### *Reliability*

The reliability of the instrument refers to whether or not the trait is being measured right (Soeken 1985). Reliability is something that is developed by utilizing the same instrument several times and comparing the results. One technique that may

be utilized to evaluate the survey instruments reliability would be to administer the same survey to a similar population at a similar military medical center and compare the results with DDEAMC's survey results.

#### *Design and Procedures*

Due to limited information available concerning healthcare staff attitudes towards journal format, the research design selected for conduct of this research project was non-experimental. A self-administered survey (Appendix A) was selected as the primary means of data collection because this research study concerns itself with personal preferences of staff/students. The survey instrument consisted of 20 questions divided into four parts. Part one of the survey, questions 1-5, was designed to gather demographic data. Part two of the survey, questions 6-9, was designed to gather computer skills/use data. Part three of the survey, questions 10-15, was designed to gather information concerning journal use and preference. Part four, questions 16-20, was designed to solicit user opinions concerning electronic journals.

Phi correlation and Chi Square tests were used to determine if statistically significant relationships existed between a person's journal preference and their age, job position, and computer skills. The data for journals preference was gathered from part four of the survey instrument, question 13. The data

for age and student status were gathered from part one of the survey instrument, questions 2 and 3. The data for computer skills were gathered from part two of the survey instrument, question 5.

#### *Schedule of Procedures*

One of the challenges of the self-administered survey is low response rate. In order to improve the response rate several steps were taken. First, preliminary notification was provided to the organization informing them of the pending survey. Secondly, a cover letter (Appendix B) explained the importance of the survey as well as the estimated time to complete the survey (based of data gathered during the pre-survey). Third, multiple venues for survey distribution were utilized to include the Health Sciences Library staff, organizational distribution, and staff/department meetings. Fourth, follow-up notification concerning the suspense date for survey completion was announced. Table 1 displays major event listings during the research project.

Table 1

## Major Event Dates

| Date      | Event                                      |
|-----------|--|
| 04 NOV 02 | Survey Instrument Completed                |
| 04 NOV 02 | Pre-Survey Completed on n=20               |
| 04 NOV 02 | Preliminary Notification of Pending Survey |
| 02 JAN 03 | Initial Survey Distribution                |
| 31 JAN 03 | Cut Off Date for Completed Surveys         |
| 03 FEB 03 | Begin Data Analysis                        |
| 07 FEB 03 | Draft Report of Findings Complete          |

The procedures set forth in this research study allow for replication at any organization supported by a Health Sciences Library. This study did not involve patients and did not require approval from the local Institutional Review Board. The ethical rights of all subjects were maintained at all times. Participation in the survey was completely voluntary and individual responses were kept anonymous. The data collected were secured and used exclusively by the researcher for purposes of analysis regarding journal preference.

### *Results*

#### *Descriptive Statistics*

A total of 500 surveys were distributed during the month long data collection period. The primary means of distribution was through departmental meetings in which a brief overview of the study was provided followed by survey distribution and collection by the surveyor. The overall survey return rate was 47 percent. A total of  $n = 235$  surveys were collected and used for this analysis. However, only  $n = 214$  surveys were completely filled out as 21 respondents were unable to complete questions 9 through 20. These respondents did not complete their surveys because they stated they had never used journals in any form. The responses were input into an Excel data set and transferred to SPSS for data analysis. The data was first analyzed using chi-square to determine if any statistically significant relationships existed between the variables of interest (age, job position and computer skills) and journal preference (print or electronic). Phi correlation was then used to determine the strength of the relationships. Significance was attributed at a probability of  $P < 0.05$ .

Survey respondents were asked to identify their job position by placing themselves into one of six predefined groups. Table 2 identifies respondents by job position. Residents/interns comprised the largest body of respondents

(24%). This may be attributed to special attention given to this group, as they were one of the heaviest users of the Health Sciences Library. The group with the least number of respondents was the administrators (9%). Staff physicians and nurses were both equally represented comprising 14% and 18% respectively.

Table 2

Survey respondents by job position (n=235)

| Job Position       | n        |
|--------------------|----------|
| Staff physician    | 14% (34) |
| Nurse              | 18% (43) |
| Resident or intern | 24% (57) |
| Administrator      | 9% (20)  |
| Student            | 15% (36) |
| Other*             | 19% (45) |

\* Other includes: chaplains; dentists; nutrition care specialists; pharmacists; physical therapist; secretaries; special staff; staff periodontist; social workers; technicians; nutrition care specialists

Demographic data is presented in Table 3. The number of male respondents exceeded female respondents by 41. The age of respondents was relatively equally distributed with the exception of two groups. The first group was 17-21 which only

comprised five percent of the total respondents. The second group was the 42 and over comprising 27% of all respondents.

Table 3

Survey respondent demographic data (n=235) n

|        |        |     |       |
|--------|--------|-----|-------|
|        | Female | 41% | (97)  |
| Gender | Male   | 59% | (138) |
|        | 17-21  | 5%  | (11)  |
|        | 22-26  | 15% | (35)  |
|        | 27-31  | 21% | (49)  |
| Age    | 32-36  | 17% | (41)  |
|        | 37-41  | 15% | (35)  |
|        | 42≤    | 27% | (64)  |

Age information is further broken out by job position in Table 4. Half of all staff physicians ranged between 22 and 36 years old. Sixty percent of all nurse respondents were in the two oldest age groups with the majority (44%) in the 42 and older group. As would be expected, the resident/intern group was in the 27-31 group.

Table 4

Age category by job position (n=235)

|                    | 17-21   | 22-26    | 27-31    | 32-36    | 37-41    | 42≤      |
|--------------------|---------|----------|----------|----------|----------|----------|
| Staff physician    | 3% (1)  | 3% (1)   | 21% (7)  | 29% (10) | 12% (4)  | 32% (11) |
| Nurse              | 0% (0)  | 16% (7)  | 16% (7)  | 7% (3)   | 16% (7)  | 44% (19) |
| Resident or intern | 0% (0)  | 9% (5)   | 40% (23) | 25% (14) | 19% (11) | 7% (4)   |
| Administrator      | 0% (0)  | 0% (0)   | 10% (2)  | 20% (4)  | 35% (7)  | 35% (7)  |
| Student            | 19% (7) | 44% (16) | 11% (4)  | 14% (5)  | 6% (2)   | 6% (2)   |
| Other              | 7% (3)  | 13% (6)  | 13% (6)  | 11% (5)  | 9% (4)   | 47% (21) |

Administrators were somewhat older overall with no members in the youngest two groups and over 70 percent in the last two groups. Students as anticipated were younger than the other categories with 74% of its members under age 32. Other reported a somewhat higher than expected age with 47% falling in the 42 and over group.

Table 5 shows the reported Health Sciences Library utilization rates by job position. Residents/interns along with staff physicians were the highest users of the Health Sciences Library. Residents/interns reported the greatest daily use (12%) while staff physicians (47%) reported the greatest weekly

use. Students reported the highest monthly use with 36%. Nurses on the other hand reported the greatest rarely/never (56%) followed by administrators (55%) and others (51%).

Table 5

Health Sciences Library utilization (n=235)

|                    | Daily   | Weekly   | Monthly  | Annually | Rarely/Never |
|--------------------|---------|----------|----------|----------|--------------|
| Staff physician    | 0% (0)  | 47% (16) | 35% (12) | 6% (2)   | 12% (4)      |
| Nurse              | 0% (0)  | 2% (1)   | 21% (9)  | 21% (9)  | 56% (24)     |
| Resident or intern | 12% (7) | 37% (21) | 30% (17) | 11% (6)  | 11% (6)      |
| Administrator      | 5% (1)  | 15% (3)  | 20% (4)  | 5% (1)   | 55% (11)     |
| Student            | 8% (3)  | 25% (9)  | 36% (13) | 0% (0)   | 31% (11)     |
| Other              | 7% (3)  | 7% (3)   | 18% (8)  | 18% (8)  | 51% (23)     |

Table 6 displays self-reported computer skills by job position. Those in the student group reported the greatest percent of computer experts followed closely by resident/interns and administrators. Nurses reported the lowest percentage of computer experts with only 5 percent. Staff physicians reported the largest percent of good computer users (71%) followed by administrators (55%). Again, the nursing respondents reported the least amount of good with only 29%. Not surprisingly, the

greatest number of moderate computer skills users came from the nursing respondents (47%). The nurse category also reported the greatest percentage of amateurs with eight percent.

Table 6

## Self-Reported Computer skills (n=235)

|                       | Expert  | Good     | Moderate | Novice | Amateur |
|-----------------------|---------|----------|----------|--------|---------|
| Staff                 | 9% (3)  | 71% (24) | 15% (5)  | 3% (1) | 3% (1)  |
| physician             |         |          |          |        |         |
| Nurse                 | 5% (2)  | 26% (11) | 49% (21) | 9% (4) | 12% (5) |
| Resident or<br>intern | 16% (9) | 51% (29) | 25% (14) | 7% (4) | 2% (1)  |
| Administrator         | 15% (3) | 55% (11) | 30% (6)  | 0% (0) | 0% (0)  |
| Student               | 17% (6) | 47% (17) | 25% (9)  | 3% (1) | 8% (3)  |
| Other                 | 13% (6) | 49% (22) | 31% (14) | 4% (2) | 2% (1)  |

Table 7 shows frequency of journal use by job position. Staff physicians and residents/interns reported the greatest daily journal use frequency (44%). Administrators (40%) and residents/interns (39%) reported the greatest weekly use of journals followed closely by staff physicians (38%). Students (36%) and other (36%) comprised the largest percent of monthly users followed by administrators (30%). Nurses comprised the largest percent of annual users with 35 percent. Nurses also

reported the most rarely/never with regards to journal use frequency.

Table 7

## Frequency of Journal Use (n=235) \*

|                    | Daily    | Weekly   | Monthly  | Annually | Rarely/Never |
|--------------------|----------|----------|----------|----------|--------------|
| Staff physician    | 44% (15) | 38% (13) | 12% (4)  | 3% (1)   | 3% (1)       |
| Nurse              | 2% (1)   | 16% (7)  | 28% (12) | 35% (15) | 19% (8)      |
| Resident or intern | 44% (25) | 39% (22) | 14% (8)  | 2% (1)   | 2% (1)       |
| Administrator      | 0% (0)   | 40% (8)  | 30% (6)  | 15% (3)  | 5% (1)       |
| Student            | 8% (3)   | 36% (13) | 36% (13) | 0% (0)   | 19% (7)      |
| Other              | 9% (4)   | 31% (14) | 36% (16) | 13% (6)  | 7% (3)       |

\*data was not provided for 4 surveys

Table 8 displays the reasons for journal use by job position. Work related research comprised the majority of responses for all categories with regard to journal use. Residents/interns and students reported the highest use of journals for work related research. Staff physicians reported equal use of journals for work related research and personal research. The least given reason for journal use was personal

research for all groups with the exception of staff physicians who reported 44 percent.

Table 8

Reason for Journal use (n=214) \*

|                    | Browsing | Research | Research | Professional |
|--------------------|----------|----------|----------|--------------|
|                    |          | Work     | Personal | Reading      |
| Staff physician    | 44% (15) | 79% (27) | 44% (15) | 79% (27)     |
| Nurse              | 47% (17) | 50% (19) | 19% (7)  | 47% (17)     |
| Resident or intern | 46% (26) | 88% (50) | 33% (19) | 72% (41)     |
| Administrator      | 47% (9)  | 63% (12) | 21% (4)  | 53% (10)     |
| Student            | 29% (8)  | 89% (25) | 39% (11) | 36% (10)     |
| Other              | 38% (15) | 58% (23) | 25% (10) | 43% (17)     |

\*total responses exceed 214 due to multiple responses by users

The majority of respondents indicated that they used journals in the conduct of their research/work as displayed in Table 9. Seventy-eight percent reported having seen an electronic journal/database. Interestingly, more people reported having used an electronic journal/data base than had reported seeing one. It is hard to believe that someone may have utilized something without ever seeing it. Therefore, the

incongruity in the numbers is probably the result of a miss-marked survey response.

Table 9

Electronic journal awareness/use (n=235)

| Question   | Yes       | No       |
|--|-----------|----------|
| Do you utilize journal and/or electronic databases in the conduct of your research/work? | 91% (214) | 9% (21)  |
| Have you ever seen an electronic journal/data base?                                      | 78% (167) | 22% (68) |
| Have you ever utilized an electronic journal/data base?                                  | 79% (169) | 21% (66) |

Journal preferences by job position are displayed in Table 10. Journal preference was very closely divided among all groups with the exception of resident/interns and nurses. Overall, 53 percent (n = 124) preferred print journals while 47 percent (n = 111) favored electronic journals. Not surprisingly the greatest preference for electronic journals was among residents/interns while the nurses least preferred electronic

journals. Staff physicians, administrators and students were all slightly more inclined to favor print journals.

Table 10

Journal preference by job position (n=235)

| Job description    | Preference     |           |
|--------------------|----------------|-----------|
|                    | Electronic (N) | Print (N) |
| Staff physician    | 44% (15)       | 56% (19)  |
| Nurse              | 33% (14)       | 67% (29)  |
| Resident or intern | 61% (35)       | 39% (22)  |
| Administrator      | 45% (9)        | 55% (11)  |
| Student            | 44% (16)       | 56% (20)  |
| Other              | 49% (22)       | 51% (23)  |

Table 11 presents feedback concerning survey respondent's (n=214) opinions regarding electronic journals. Seventy-one percent of respondents strongly agree/agree that electronic journals are much easier to use than their print counter parts because of their ease of search ability. Seventy percent of respondents either strongly agreed or agreed that they preferred electronic journals because of their accessibility from multiple locations. Sixty-one percent of respondents strongly agree/agree that the content of electronic journals are comparable to that of the same print journals.

Table 11

## Electronic Journal Opinions (n=214) \*

|  | Strongly Agree<br>5 | Agree       | Neutral     | Disagree    | Strongly Disagree<br>1 | Mean   | S.D.   |
|--|---------------------|-------------|-------------|-------------|------------------------|--------|--------|
| I find it much easier to utilize electronic journals to conduct research because of their search ability | 33%<br>(70)         | 38%<br>(81) | 25%<br>(53) | 3%<br>(7)   | 1%<br>(3)              | 3.9716 | 0.9137 |
| I prefer electronic journals because they are accessible multiple locations via the World Wide Web       | 33%<br>(71)         | 37%<br>(80) | 24%<br>(51) | 5%<br>(10)  | 1%<br>(2)              | 3.9719 | 0.9188 |
| I believe the content in an electronic journal is comparable to that of the same print journal version   | 25%<br>(53)         | 36%<br>(78) | 25%<br>(54) | 13%<br>(28) | 0%<br>(1)              | 3.7196 | 0.9957 |

\*no data provided for 21 surveys

Survey participants were asked questions concerning their opinions regarding the Health Sciences Library and electronic

journals. The results are displayed in Table 12. Forty-eight percent strongly agree/agree that the Health Sciences Library should purchase electronic journals if resources were constrained as opposed to only 13% who strongly disagree/disagree. Thirty-nine percent were neutral on this point. Fifty-seven percent of respondents strongly agree/agree they would reduce the number of print journals in the Health Sciences Library in order to have electronic journals as opposed to 14% who strongly disagree/disagree. Thirty percent were indifferent. A large number of respondents (63%) strongly agree/agree that they would more likely use the Health Sciences Library's electronic resources if they had remote access from home or office while only two percent of respondents strongly disagree/disagree with this idea. Fifty-four percent of respondents strongly agree/agree that they would increase electronic journal use if they were provided educational classes whereas 9% strongly disagree/disagree.

#### *Inferential Statistics*

Due to the fact that this research study is exploratory in nature and all variables being evaluated were nominal (group membership vs. non-membership), chi-square was selected to test for statistical significance between the independent variables in the age, job position and computer skills categories. Chi-square is the most commonly used statistical analysis for

Table 12

Health Sciences Library and Electronic Journals (n=214) \*

|  | Strongly Agree<br>5 | Agree       | Neutral     | Disagree    | Strongly Disagree<br>1 | Mean   | S.D.   |
|--|---------------------|-------------|-------------|-------------|------------------------|--------|--------|
| If the HSL were limited to subscribe to either print or electronic journals only, I would prefer they purchase electronic                                      | 20%<br>(43)         | 28%<br>(59) | 39%<br>(83) | 11%<br>(24) | 2%<br>(5)              | 3.5187 | 1.0103 |
| I would be willing to reduce then number of print journal titles in the HSL collection (due to budgetary issues) in order to order to have electronic journals | 17%<br>(36)         | 40%<br>(85) | 30%<br>(64) | 12%<br>(25) | 2%<br>(4)              | 3.5794 | 0.9645 |
| I would be more likely to utilize DDEAMC HSL electronic resources if I had remote access (home, office) **   | 25%<br>(53)         | 38%<br>(81) | 22%<br>(48) | 2%<br>(5)   | 0%<br>(1)              | 4.0841 | 0.8516 |

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|  | Strongly Agree<br>5 | Agree       | Neutral     | Disagree   | Strongly Disagree<br>1 | Mean   | S.D.   |
|--|---------------------|-------------|-------------|------------|------------------------|--------|--------|
| If DDEAMC HSL offered educational classes on electronic resources and their use I would be more likely to use them | 15%<br>(33)         | 39%<br>(83) | 36%<br>(78) | 7%<br>(16) | 2%<br>(4)              | 3.5841 | 0.9037 |

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\*no response provided on 21 surveys

\*\*only 188 responses reported

nominal data. Phi correlation was then used to test for measures of relation between the variables. Significance was attributed at a probability of  $P < 0.05$ .

The results for the Chi-square test are shown in Table 13. The age category yielded statistically significant results for the 37-41 group with a Chi value of 5.635 and the 42 plus group with a Chi value of 7.339. The job position category yielded two statistically significant groups, nurses and residents/interns. The Chi value for nurses was 4.548 while the Chi value for resident/intern was 6.062. The computer skill category yielded the greatest number of statistically significant groups with four. Expert with a chi value of 4.437, good with a chi value of 4.544, moderate with a chi value of 7.573 and amateur with a chi value of 10.33.

Pearson's Phi correlation was used to test the strength of the relationship between the independent variables in the age, job position and computer skills categories with the dependent variable, journal preference. The phi correlation test results are displayed in Table 14.

The age group 37-41 had a positive 0.155 phi correlation with an exact P of 0.018. This suggests that persons within this group were more inclined to prefer electronic journals. The age group 42 plus had an inverse correlation of -0.177 with an exact P of 0.007. The inverse correlation suggests persons in this group were more likely to prefer print journals. The job position nurse group had an inverse correlation of -0.139 with an exact P of 0.033. The inverse correlation indicates that members of the nurse group are more inclined to utilize print journals. Residents/interns yielded a positive correlation of 0.161 with an exact P of 0.014. This indicates residents/interns were more likely to prefer electronic journals. The Computer skills category had the greatest number of significant correlations of any of the three categories being evaluated. Experts had a positive correlation of 0.137 with an exact P of 0.035. Those in the good category had a positive correlation of 0.139 with an exact P of 0.033. These two correlations indicate that those in the expert and good category

Table 13

Chi-Square ( $\chi^2$ ) Values for Variables of Interest and Journal Preference

| Variable Category      | $\chi^2$ | Degrees of Freedom | Asymp. Sig (2-sided) |
|------------------------|----------|--------------------|----------------------|
| <b>Age</b>             |          |                    |                      |
| 17-21                  | 0.015    | 1                  | 0.904                |
| 22-26                  | 0.289    | 1                  | 0.589                |
| 27-31                  | 0.356    | 1                  | 0.551                |
| 32-36                  | 0.016    | 1                  | 0.989                |
| 37-41                  | 5.635*   | 1                  | 0.018                |
| 42 plus                | 7.339**  | 1                  | 0.007                |
| <b>Job Position</b>    |          |                    |                      |
| Staff Physician        | 0.155    | 1                  | 0.694                |
| Nurse                  | 4.548*   | 1                  | 0.033                |
| Resident/Intern        | 6.062*   | 1                  | 0.014                |
| Administrator          | 0.044    | 1                  | 0.834                |
| Student                | 0.133    | 1                  | 0.716                |
| Other                  | 0.061    | 1                  | 0.805                |
| <b>Computer Skills</b> |          |                    |                      |
| Expert                 | 4.437*   | 1                  | 0.035                |
| Good                   | 4.544*   | 1                  | 0.033                |
| Moderate               | 7.573**  | 1                  | 0.006                |
| Novice                 | 0.625    | 1                  | 0.429                |
| Amateur                | 10.33**  | 1                  | 0.001                |

\* P &lt; 0.05

\*\* P &lt; 0.01

Table 14

Phi Correlation ( $\Phi$ ) values

| Variable Category      | $\Phi$   | Exact P |
|------------------------|----------|---------|
| <b>Age</b>             |          |         |
| 17-21                  | -0.008   | 0.904   |
| 22-26                  | 0.035    | 0.592   |
| 27-31                  | 0.039    | 0.553   |
| 32-36                  | -0.008   | 0.899   |
| 37-41                  | 0.155*   | 0.018   |
| 42 plus                | -0.177*  | 0.007   |
| <b>Job Position</b>    |          |         |
| Staff Physician        | -0.026   | 0.695   |
| Nurse                  | -0.139*  | 0.033   |
| Resident/Intern        | 0.161*   | 0.014   |
| Administrator          | -0.139   | 0.835   |
| Student                | 0.024    | 0.717   |
| Other                  | 0.016    | 0.806   |
| <b>Computer Skills</b> |          |         |
| Expert                 | 0.137*   | 0.035   |
| Good                   | 0.139*   | 0.033   |
| Moderate               | -0.179** | 0.006   |
| Novice                 | 0.052    | 0.431   |
| Amateur                | -0.209** | 0.001   |

\* P &lt; 0.05

\*\* P &lt; 0.01



prefer electronic journals to print. The moderate category on the other hand revealed an inverse correlation of -0.179 with an exact P of 0.006. The amateur category also showed a markedly strong inverse correlation of -0.209 with an exact P of 0.001. These inverse correlations indicated that members of the moderate and amateur groups were more likely to prefer print journals.

Even though statistically significant results were not found with all variables in each of the three categories with journal preference, the results yielded important information that supports the three hypotheses being tested. The hypothesis that the older a person is the less likely they are to prefer electronic journals is supported with the results presented in Tables 13 and Table 14. The results clearly demonstrate an inverse correlation between the 42 and over category and electronic journals. Therefore, the null hypothesis is rejected and the alternate hypothesis is accepted. The hypothesis that a person's job position may affect journal preference is also supported. Members of the nurse group (permanent staff) clearly prefer the use of print journals as shown by the inverse correlation with electronic journals. Whereas intern/residents who were still in training programs preferred electronic journals as evidenced by their positive correlation between their group membership and electronic journals. The fact that

one groups members were permanent party staff and preferred print journals while the other group, residents/interns, were still in their educational process preferred electronic journals clearly supports the alternate hypothesis. The null hypothesis is therefore rejected and the alternate hypothesis is accepted. The hypothesis that the greater a persons computer skills the more likely they are to prefer electronic journals is greatly supported by the data presented in Tables 13 & 14. Persons with expert and good computer skills both had positive correlations with group membership and electronic journals. Those persons belonging to the moderate and amateur categories both had inverse correlations with electronic journals. This evidence supports the hypothesis that the greater a persons computer skills the more likely they are to prefer electronic journals. The null hypothesis is rejected and the alternate hypothesis is accepted.

## Discussion

### *Study Limitations*

This study provided valuable data on DDEAMC staff preferences. However, this study is not without limitations. The sample size for this study, n=235, was compromised of a sample of convenience rather than a true random sample. Constraints in both time and resources prevented the sampling of the entire DDEAMC staff. Consequently, the research focused on those individuals who were most likely to utilize the Health Sciences Library. This "focus" may have prevented the sample from being "truly" random. The focus on "professional" staff and/or Health Sciences Library users may have discriminated against those who never use the library. This was deemed acceptable because a person is less likely to use professional journals in the conduct of their work/research if they never go to the library and would be less likely to have an opinion concerning journal format.

The data collected by the survey instrument was nominal. Nominal data scales are often considered the least powerful of the four data types because they suggest no order or distance relationship (Cooper & Schindler 2001). Hence nominal scales waste any information a sample element might share about varying degrees of the property being measured. However, because this research was exploratory in nature the object was to determine

if relationships existed between certain variables rather than secure exact measures.

Another limitation of the study was that it was conducted at one site, DDEAMC. The opinions of staff members at DDEAMC may not be representative of staff members at other medical institutions. However, the results from DDEAMC may be used as a comparison for future studies at other locations.

The study was also limited because the majority of the population from which the sample was drawn was military. Due to the fact the military has age limits on personnel the overall sample age may be lower than if the survey were conducted at a similar civilian institution without age restrictions. The age restriction limitation would have to be taken into consideration before one was to make generalizations about other organizations unless they were also military.

Other limitations include a limited data collection period and the survey instrument. The data collection period was limited to 30 days to allow for data analysis prior to submission of the research report. In an effort to make the survey user friendly it was constructed to encourage maximum response. The brevity of the survey limited the specificity of the data collected which in turn limited the amount and types of analysis that could be conducted.

### *Findings*

The findings from this study indicate that there are statistically significant relationships between variables in the age, job position and computer skills categories and journal preference. The results support the three hypotheses concerning age, job position and computer skills.

The findings with the age category were not as great as expected yet they still confirmed the theory that the older a person the more likely they were to prefer print journals. The age restrictions in the military greatly limit the number of older persons on active duty.

Surprisingly, the youngest age group 17-21, was the second most likely to prefer print journals. This may be attributable that persons in this category are typically new members of the military who reside in the barracks. Most have limited disposable income to spend on computers and are less likely to have pursued advanced degrees that typically require a considerable amount of research. The age groups 22-26, 27-31, and 32-36 were evenly divided between print and electronic journals. Unexpectedly, the second oldest age group on the scale, 37-41, showed the greatest preference for electronic journals with 66 percent. A further review of the literature revealed that the majority of computer/Internet users in the United States today are highly educated individuals with an

average age of 38 years old (The Association of Personal Computer User Groups, 2002). This may be indicative that this group adopted computers at an earlier age and continued to develop their skills and use them over time. As supported in the literature, the oldest age group, 42 and over clearly demonstrated a preference for print journals.

The results of the job position being related to journal preference was supported by two out of the six variables. The expected results would have been for members of the permanent party staff (staff physicians, nurses, administrators) to prefer print journals while those in a educational/training status (intern/residents and students) to prefer electronic journals. One variable from the permanent party (nurses) and one from educational/training (intern/residents) supported the hypothesis. Nurses displayed a strong preference for print journals while staff physicians and administrators showed a slight preference over electronic. Interns/residents indicated a strong preference for electronic where as students and other showed a lower preference for electronic journals. Residents/interns are more likely to prefer electronic journals due to the large amounts of research conducted as part of their educational/training process. The majority of respondents reporting themselves as students were enrolled in the 91W medical specialist course (EMT basic course). Unlike previous

studies where "students" were undergraduate and graduate level students, the students reported in this study were in a "vocational" training program. The 91W program requires research on certain topics but the demands for computer skills and research are not equivalent to the requirements in undergraduate and graduate level college courses. Therefore, the student group members in this study showed a much lower than expected preference for electronic journals. The staff physicians were closely divided among journal preference, 56% favored print while 44% favored electronic.

This study clearly illustrates a relationship between computer skills and journal preference. Four out of the five variables in this category supported the alternate hypothesis as predicted. The fact that expert and good computer users prefer electronic journals while moderate and amateur users prefer print clearly demonstrates a relationship between computer skills and journal preference. With everyday that passes computer technology continues to expand in our lives. This will result in today's children being more skilled in the art of computer use in the future. If this holds true, it is safe to assume that more people will be adept in computer use and may have a greater preference for electronic journals in the future.

The findings suggests that age, job position and computer skills have relationships with journal preference. Currently,

the data does not unequivocally support each of the variables in the three categories but there is reason to believe that these relationships between variables will become more pronounced in the future. These relationships have important implications for the Health Sciences Library. At present, DDEAMC staff and students are almost evenly divided among print (53%) and electronic (47%) journal preferences. The Health Sciences Library must weigh the needs and preferences of today's staff/students while planning to meet the needs of tomorrow's staff/students.

#### *Implications*

DDEAMC Health Sciences Library may utilize the results to develop a strategic plan. If the results indicate a strong preference for electronic journals, the Health Sciences Library may consider applying more resources towards electronic journals procurement as opposed to print journals. The results may also be utilized to show the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) how the Health Sciences Library is working to meet the standards for knowledge-based information as set forth in standard IM.9 (Joint Commission for the Accreditation of Healthcare Organizations, 2002). The results from this research project may assist in developing a strategic plan for the Medical Command (MEDCOM) library network with regards to issues such as group purchases of electronic

journals, group licensures, and even establishing a central archiving repository for all Army Health Sciences Libraries. The results should also be useful to anyone interested in user preferences with regards to electronic versus print journals.

The findings from this research project may have a positive impact on both policies and procedures. The results may assist DDEAMC Health Sciences Library in deciding how to best allocate limited resources on journal procurement, whether it be electronic or print. The results may facilitate the development of a strategic plan that may or may not involve future staffing changes to accommodate new business practices. The information gathered may also be used to guide future library design and systems architecture. Additionally, by determining what the end-user needs are, the Health Sciences Library can better meet those needs. By better meeting the needs of the staff/students, the Health Science Library will indirectly improve the level of patient care provided at DDEAMC.

## Recommendations

### *Market existing services*

The data presented coupled with several of the comments written (Appendix C) on the surveys suggests that some DDEAMC staff/students may not fully understand the capabilities that already exist at the Health Sciences Library. Currently Health Sciences Library users have access to a wealth of medical literature from their desktops twenty-four hours a day, seven days a week (Miller, 2002). Among the databases available are Health Business with full-text articles for over 420 business health related journals. InfoTrac Health Reference Center Academic that provides over 150 full-text journals, 500 pamphlets and numerous reference books on health and fitness. MD Consult that provides full-text for over 43 journals and 40 reference books not too mention over 600 practice guidelines and thousands of patient education handouts. Ovid, a data base that provides full-text articles for over 80 journals from MEDLINE, CINAHL, CancerLit, AIDSLINE, Health Star, PSYCHInfo and Evidence-based Medicine to name a few. Stat Ref which provides access to over 30 medical reference books. And Up-To-Date which provides topic reviews with instant evidence-based answers to commonly asked clinical practice questions. However, most of the above-mentioned databases are limited to access from South Eastern Regional Medical Command (SERMC) or DDEAMC desktops via

IP recognition. Some sites are accessible from the World Wide Web with a User ID and password available from the Health Sciences Library. A recommendation is that the Health Sciences Library aggressively market the services currently available. In doing so particular attention should be made to educate the staff on those programs that can only be accessed from within the DDEAMC/SERMC domain and those that may be accessed remotely.

*Increase print capability*

A second observation was that of limited print capability. Several respondents made comments that they preferred searching journals electronically but found it difficult to print the articles because of limited printing capabilities in the Health Sciences Library. Over 70 percent of respondents indicated that they found electronic journals easier to utilize for research. As mentioned earlier in this study, the literature suggests that people prefer to read printed material versus computer screens. This study supports this theory as evidenced by the number of persons who stated that they would search for articles electronically then print them out for reading. As indicated in the literature, a few comments were made that addressed the quality of electronic journal articles when printed. Some respondents stated that the quality of an article printed from an electronic journal is not the same as that found in a print journal. But overall it appears that most people are content

with the print quality of electronic journals because their convenience more than makes up for the print quality. The Health Sciences Library may want to research the possibility of increasing its current printing capabilities by adding additional printers.

*Strategic plan development*

One can infer from the results that the resident/interns who prefer electronic journals will undoubtedly become tomorrow's staff physicians. Tomorrow's residents/interns, students and others who are now growing up in a more technologically advanced environment are more likely to possess greater computer skills than their counterparts today. In fact, many of today's medical training programs require students to have laptop computers and/or hand held computing devices. This is indicative of the fact that the demand for electronic media is not likely to go away or decline. Quite to the contrary, all indications are that it will continue to increase over the next decade.

Based on the findings in this study it is recommended that the Health Sciences Library continue to operate utilizing both print and electronic journals for the next few years. The staff is currently split down the middle on journal preference making a radical change either way may not be wise. The Health Sciences Library is designed to assist the staff in the accomplishment of

their jobs. Everyone's job at DDEAMC ultimately affects patient care, either directly or indirectly. This must be taken into consideration before any major change in business practice occurs, to avoid negatively impacting patient care. However, the data suggests that times and preferences are changing in favor of electronic media. The Health Sciences Library should develop a strategic plan that facilitates a transition to electronic media. Particular attention should be paid to address the four issues currently being faced by organizations in this transition process including past issues, archiving, purchasing and cost.

First, the plan should pay particular attention to address the concerns about access to back databases if an electronic subscription is terminated. This is a very controversial area among academic libraries and publishers at this time. The Health Sciences Library should thoroughly research what options/rights it will have if it terminates an electronic journal subscription. One idea maybe to subscribe to a service that specializes in providing continued access to scholarly journals such as JSTOR.

Secondly, consideration should be given to establishing a centralized repository for archiving print journals for the entire AMEDD at one central location. Given today's technology there is no need for multiple facilities to store multiple

copies of the same print journals. Researchers can coordinate with librarians to scan/fax an article from one location to another in less than one day. Not too mention that storing journals at one centralized site would free up much needed space at multiple facilities. The MEDCOM library at the AMEDD Center and School would be the logical proponent for this program.

Third, purchasing consortiums among Army Medical Libraries for electronic journals should be used when procuring electronic journals. This is currently being done for some electronic journal titles. Again, the AMEDD Center and School Library would be the logical choice to take lead and negotiate purchases and site licenses for the entire MEDCOM.

Lastly, some members of the DDEAMC staff thought switching from print to electronic journals would result in cost savings. The purpose of this research did not focus on that particular aspect but all indications from the literature run contrary to this belief. If anything, the alleged cost saving become a wash due to the fact that electronic journals cost less to procure but it cost more to maintain a network system and dedicated staff to oversee their operation.

### Conclusion

There is no doubt that electronic journals are an enigma looming on the horizon for many organizations. It is difficult to truly ascertain the impact they will have on an organization until they are fully accepted and integrated. Many organizations, such as the Health Sciences Library, currently support customers who prefer print journals as well as those who prefer electronic journals. A review of the literature indicates that electronic journal users are slowly replacing print journal users. The main reasons cited are ease of searchability, currency of information and convenience. Electronic journal users also tend to be professional students or recent graduates who are younger in age and more skilled in computer use. Conversely, print journal users tend to be older and less computer skilled. It is safe to assume that today's electronic journals will retain their skills and preferences for electronic journals in the future. Therefore, organizations such as the Health Sciences Library need to develop strategic plans that will facilitate their transition from print journals to electronic journals to provide uninterrupted support of their customers.

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## Appendix A

**Needs Assessment Survey****1. Gender:** \_\_\_\_\_ Female \_\_\_\_\_ Male**2. Age:** \_\_\_\_\_**3. Status:**

\_\_\_\_ Staff Physician      \_\_\_\_ Resident or Intern      \_\_\_\_ Student (Specify) \_\_\_\_\_  
 \_\_\_\_ Nurse      \_\_\_\_ Administrator      \_\_\_\_ Other (Specify) \_\_\_\_\_

**4. Are you currently a student in any program?**

\_\_\_\_ Yes      \_\_\_\_ No

**5. How often do you utilize DDEAMC Medical Research Library?**

\_\_\_\_ Daily      \_\_\_\_ Weekly      \_\_\_\_ Monthly      \_\_\_\_ Once a Year      \_\_\_\_ Rarely/Never

**6. How would you rate your level of computer experience?**

\_\_\_\_ Expert      \_\_\_\_ Good      \_\_\_\_ Moderate      \_\_\_\_ Novice      \_\_\_\_ Amateur

**7. How frequently do you use computers?**

\_\_\_\_ Daily      \_\_\_\_ Almost Daily      \_\_\_\_ Weekly      \_\_\_\_ Every Couple of Weeks      \_\_\_\_ Rarely or Never

**8. How often do you use the following resources:** Place "X" in boxes that apply

| Application            | Daily | Almost Daily | Weekly | Once Every couple of Weeks | Rarely or Never |
|------------------------|-------|--------------|--------|----------------------------|-----------------|
| Windows Based Software |       |              |        |                            |                 |
| Spread Sheets          |       |              |        |                            |                 |
| Data Base              |       |              |        |                            |                 |
| Word Processing        |       |              |        |                            |                 |
| Email                  |       |              |        |                            |                 |
| Entertainment          |       |              |        |                            |                 |

**9. How often do you utilize the following on-line resources?** Place "X" in boxes that apply

| Application                            | Daily | Almost Daily | Weekly | Once Every couple of Weeks | Rarely or Never |
|--|-------|--------------|--------|----------------------------|-----------------|
| Surf Web                               |       |              |        |                            |                 |
| On Line Data Base (Full-text Articles) |       |              |        |                            |                 |
| On Line References                     |       |              |        |                            |                 |
| On Line Journals                       |       |              |        |                            |                 |

**10. Do you utilize professional journals/electronic databases in the conduct of your research/work?**

\_\_\_\_ Yes      \_\_\_\_ No

**11. How often do you utilize professional journals?**

\_\_\_\_ Daily      \_\_\_\_ Weekly      \_\_\_\_ Monthly      \_\_\_\_ Yearly      \_\_\_\_ Never (Skip to Question 22)

**12. What is your primary use for professional journals?**

- \_\_\_\_ Browsing
- \_\_\_\_ Research a particular topic of interest (work related)
- \_\_\_\_ Research a particular topic of interest (personal)
- \_\_\_\_ Professional Reading

**13. Have you ever seen an electronic journal/data base?**

Yes       No

**14. Have you ever utilized an electronic journal/data base?**

Yes       No

**15. Which medium of journals do you prefer?**

Print       Electronic Journal

*Please indicate your preference to the following statements by circling the appropriate number. 1 indicates strongly agree and 5 indicates strongly disagree.*

**16. I find it much easier to utilize electronic journals/data base to conduct research because of the ease of searching for a particular subject.**

1      2      3      4      5

**17. I find electronic journals/data bases to be more convenient than print journals.**

1      2      3      4      5

**18. I prefer electronic journals/data bases because I have the capability to access them from multiple locations via the World Wide Web.**

1      2      3      4      5

**19. I believe the content in an electronic journal is comparable to that of the same print journal version.**

1      2      3      4      5

**20. If DDEAMC Health Research Library were limited to subscribing to either the print version of a journal or the electronic version of a journal (to include full text article data bases) only, I would prefer they purchase the electronic version.**

1      2      3      4      5

**21. I would be more likely to utilize DDEAMC Health Research Library electronic resources if I had remote access (office, home, etc.) than I currently do.**

1      2      3      4      5

**22. If DDEAMC Health Research Library offered educational classes on electronic resources and their use I would be more likely to use them.**

1      2      3      4      5

**Additional Comments:**

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*Thank you for your time and assistance in completing this survey. The information you provided will assist the DDEAMC Health Science library better meet your needs.*



## Appendix B

## ***Health Sciences Library Needs Assessment Survey***

The purpose of this survey is to provide feedback to the Dwight D. Eisenhower Army Medical Center (DDEAMC) Health Sciences Library regarding format preferences (electronic or print) for professional journals.

This survey should take you no more than five minutes to complete. The data collected will serve two purposes. First, it will be utilized to provide direct feedback to the DDEAMC Health Sciences Library concerning your professional journal format preference. Second, the data will be analyzed as part of a Graduate Management Project (GMP) for Baylor University that will contribute to the body of knowledge on medical center staff preferences regarding journal format preferences.

Thank you in advance for taking time out to complete this short survey.

CPT William R. Love  
Baylor Administrative Resident

***Please place the completed survey in the attached envelope and return it through distribution.***

## Appendix C Hand written comments on surveys

| <b>Survey</b> | <b>Comments</b>  |
|---------------|--|
| 15            | There is poor availability of print journals   |
| 23            | Asterisks on Strongly agree with HSL use with remote Access  |
| 27            | As long as the library gave me access from my computer at home it would be excellent to have electronic journals   |
| 32            | Electronic resources are the future. We must go with them.   |
| 37            | I only use print after electronic has failed to provide the info   |
| 40            | It would be nice if the computers had Microsoft word   |
| 55            | It is time to go digital. I recommend the old journals be scanned into digital format too!!  |
| 57            | Need access to pastoral care journals  |
| 59            | Save the trees!  |
| 74            | Go electronic!!  |
| 90            | Electronic would be better if unrestricted printing availability   |
| 92            | I dislike electronic journal for primary research not able to easily print /distribute/collect electronic articles because of poor print resources   |
|               | Print journals are easier to browse  |
| 93            | There is nothing like turning the pages of a book, journal, etc.   |
| 95            | The questions above are obviously biased towards electronic media, but I don't mind because I happen to agree  |
| 102           | Providing remote access to utilize HSL at DEAMC will greatly enhance knowledge and decrease time wasted  |
| 106           | There should be some kind of 24 hour access allowed to the staff   |
| 113           | I would recommend using the learning resource center at the uniformed service university Bethesda Maryland as a model for our library.   |
|               | Especially the electronic journal list they ave is very extensive. I feel resources would be best use for electronic journals.   |
| 120           | With reading print journals I can take my time and refer back to them...frustrating to have to locate a certain topic I research   |
|               | If I don't book mark it; my eye's get tired at times with computer   |
| 126           | Graphics more readable (doesn't always print right electronic version)   |
| 132           | I enjoy to search the electronic data bases for the information But the articles are still needs to be printed for any work to be completed  |
| 136           | I prefer the printed version   |
| 148           | The use of electronic data is superior, but that is if access is easy. Also, IMD support for personal/military computers is important  |
| 151           | I think the library needs to have more computers for use of research and also add some things to the computer such as Ms Word and PowerPoint. It could be a little more useful to students who don't have personal computers |
| 155           | I would like to see a library terminal installed in the nursing anesthesia classroom (721-7005) Also, I would like to be able to access e-journal from home  |
| 158           | Electronic journals sometimes have poor graphical reproduction especially pathology images   |

|     |  |
|-----|--|
| 165 | It would be extremely nice to be able to access the library from home. If that were a possibility and still able to print and copy attachments (full text) I would strongly be in favor of going to electronic journal databases, especially if it would increase the number of journals |
| 177 | Remote access is a great idea!   |
| 180 | If journals are to be accessed online I want to make sure pictures and charts are included and that these can be printed out   |
| 208 | Only way to access journals is electronic because I am outside the hospital  |
| 212 | I prefer to use electronic databases for searching the literature; but I prefer print journals for reading specific articles   |
| 221 | Can print pdf format myself without having to make it to library   |